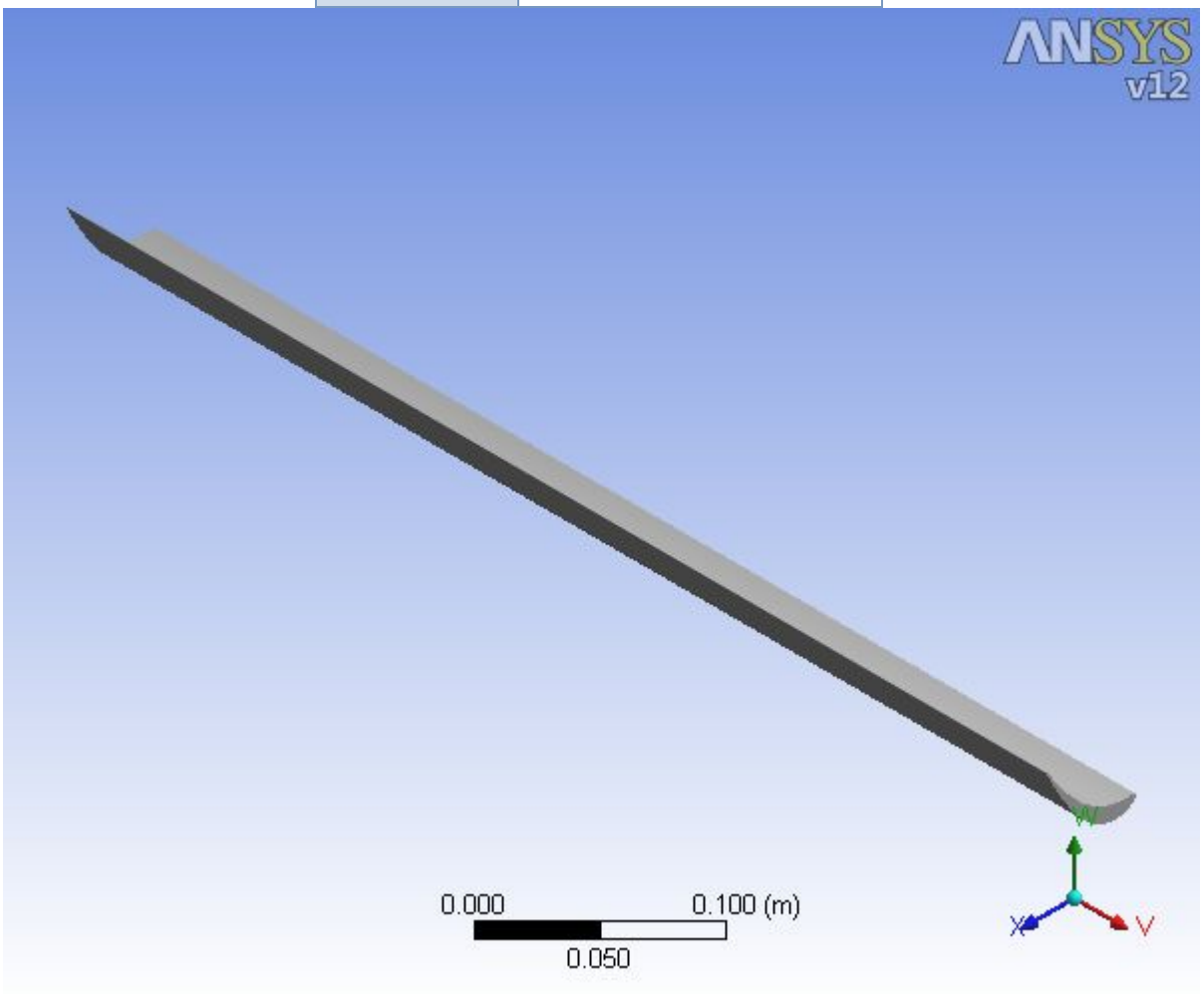
Project

First Saved	Tuesday, December 06, 2011
Last Saved	Sunday, October 13, 2013
Product Version	12.0.1 Release



Contents

Units

TABLE 1

Unit System	Metric (m, kg, N, s, V, A) Degrees rad/s Celsius
Angle	Degrees
Rotational Velocity	rad/s
Temperature	Celsius

Model (D4)

Geometry

TABLE 2
Model (D4) > Geometry

Object Name	*Geometry*
State	Fully Defined
Definition	
Source	D:\Ansys Gas Turbine Blade\Stage 5 rev_files\dp0\SYS\DM\SYS.agdb
Type	DesignModeler
Length Unit	Millimeters
Element Control	Program Controlled
Display Style	Part Color
Bounding Box	
Length X	0.5509 m
Length Y	4.1902e-002 m
Length Z	5.0363e-002 m
Properties	
Volume	1.7979e-004 m^3
Mass	1.4114 kg
Scale Factor Value	1.
Statistics	
Bodies	1
Active Bodies	1
Nodes	22603
Elements	10846
Mesh Metric	None

Preferences	
Import Solid Bodies	Yes
Import Surface Bodies	Yes
Import Line Bodies	No
Parameter Processing	Yes
Personal Parameter Key	DS
CAD Attribute Transfer	No
Named Selection Processing	No
Material Properties Transfer	No
CAD Associativity	Yes
Import Coordinate Systems	No
Reader Save Part File	No
Import Using Instances	Yes
Do Smart Update	No
Attach File Via Temp File	Yes
Temporary Directory	C:\Users\AgungDrajat\AppData\Roaming\Ansys\v120
Analysis Type	3-D
Mixed Import Resolution	None
Enclosure and Symmetry Processing	Yes

TABLE 3
Model (D4) > Geometry > Parts

Object Name	*Solid*
State	Meshed
Graphics Properties	
Visible	Yes
Transparency	1
Definition	
Suppressed	No
Stiffness Behavior	Flexible
Coordinate System	Default Coordinate System
Reference Temperature	By Environment
Material	
Assignment	Structural Steel
Nonlinear Effects	Yes
Thermal Strain Effects	Yes
Bounding Box	
Length X	0.5509 m
Length Y	4.1902e-002 m
Length Z	5.0363e-002 m
Properties	
Volume	1.7979e-004 m^3
Mass	1.4114 kg
Centroid X	0.95933 m
Centroid Y	5.0697e-003 m
Centroid Z	-1.7596e-003 m
Moment of Inertia Ip1	3.3004e-004 $kg \cdot m^2$
Moment of Inertia Ip2	3.5783e-002 $kg \cdot m^2$
Moment of Inertia Ip3	3.5487e-002 $kg \cdot m^2$
Statistics	
Nodes	22603
Elements	10846
Mesh Metric	None

Coordinate Systems

TABLE 4
Model (D4) > Coordinate Systems > Coordinate System

Object Name	*Global Coordinate System*
State	Fully Defined
Definition	
Type	Cartesian
Ansys System Number	0.
Origin	
Origin X	0. m
Origin Y	0. m
Origin Z	0. m
Directional Vectors	
X Axis Data	[1. 0. 0.]
Y Axis Data	[0. 1. 0.]
Z Axis Data	[0. 0. 1.]

Mesh

TABLE 5
Model (D4) > Mesh

Object Name	*Mesh*
State	Solved
Defaults	
Physics Preference	Mechanical
Relevance	0
Sizing	
Use Advanced Size Function	Off
Relevance Center	Coarse
Element Size	Default
Initial Size Seed	Active Assembly
Smoothing	Medium
Transition	Fast
Span Angle Center	Coarse
Minimum Edge Length	4.7303e-004 m
Inflation	
Use Automatic Tet Inflation	None
Inflation Option	Smooth Transition
Transition Ratio	0.272
Maximum Layers	5
Growth Rate	1.2
Inflation Algorithm	Pre
View Advanced Options	No
Advanced	
Shape Checking	Standard Mechanical
Element Midside Nodes	Program Controlled
Straight Sided Elements	No
Number of Retries	Default (4)
Rigid Body Behavior	Dimensionally Reduced
Mesh Morphing	Disabled
Pinch	
Pinch Tolerance	Please Define
Generate on Refresh	No

Statistics	
Nodes	22603
Elements	10846
Mesh Metric	None

Static Structural (D5)

TABLE 6
Model (D4) > Analysis

Object Name	*Static Structural (D5)*
State	Solved
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Solver Target	ANSYS Mechanical
Options	
Environment Temperature	22. °C
Generate Input Only	No

TABLE 7
Model (D4) > Static Structural (D5) > Analysis Settings

Object Name	*Analysis Settings*
State	Fully Defined
Step Controls	
Number Of Steps	1.
Current Step Number	1.
Step End Time	1. s
Auto Time Stepping	Program Controlled
Solver Controls	
Solver Type	Program Controlled
Weak Springs	Program Controlled
Large Deflection	Off
Inertia Relief	Off
Nonlinear Controls	
Force Convergence	Program Controlled
Moment Convergence	Program Controlled
Displacement Convergence	Program Controlled
Rotation Convergence	Program Controlled
Line Search	Program Controlled
Output Controls	
Calculate Stress	Yes
Calculate Strain	Yes
Calculate Results At	All Time Points
Analysis Data Management	
Solver Files Directory	D:\BIKER ToeN\TA KAMOJANG\MR FARID\Ansys Gas Turbine Blade\Stage 5 rev_files\dp0\SYS\MECH\
Future Analysis	None
Scratch Solver Files Directory	
Save ANSYS db	No
Delete Unneeded Files	Yes
Nonlinear Solution	No
Solver Units	Active System
Solver Unit System	mks

TABLE 8
Model (D4) > Static Structural (D5) > Loads

Object Name	*Fixed Support*	*Fixed Support 2*
State	Fully Defined	
Scope		
Scoping Method	Geometry Selection	
Geometry	1 Face	
Definition		
Type	Fixed Support	
Suppressed	No	

TABLE 9
Model (D4) > Static Structural (D5) > Imported Load (Solution 1)

Object Name	*Imported Load (Solution 1)*
State	Fully Defined
Definition	
Type	Imported Data
Interpolation Type	CFD Results Interpolator
Suppressed	No

TABLE 10
Model (D4) > Static Structural (D5) > Imported Load (Solution 1) > Imported Pressure

Object Name	*Imported Pressure*
State	Solved
Scope	
Scoping Method	Geometry Selection
Geometry	1 Face
Definition	
Type	Imported Pressure
Suppressed	No
Transfer Definition	
CFD Surface	R1 Blade
CFD Data	
CFD Results File	D:\BIKER ToeN\TA KAMOJANG\MR FARID\Ansys Gas Turbine Blade\Stage 5 rev_files\dp0\SYS\MECH\Solution 1\CFX_004.res

Model (D4) > Static Structural (D5) > Imported Load (Solution 1) > Imported Pressure > Imported Load Transfer Summary

CFD Load Transfer Summary

CFD Computed Forces from CFD Results File **D:\Ansys Gas Turbine Blade\Stage 5 rev_files\dp0\SYS\MECH\Solution 1\CFX_004.res**
X-component = -8.1249e-003 N
Y-component = -36.852 N
Z-component = 26.945 N

Mechanical Mapped Forces for Mechanical Surface File **D:\Ansys Gas Turbine Blade\Stage 5 rev_files\dp0\SYS\MECH\Import_ANSYS_25.cdb**
X-component = -1.0183e-002 N
Y-component = -4.8225 N
Z-component = 1.5759 N

100% of Mechanical nodes were mapped to the CFD surface.

Solution (D6)

TABLE 11
Model (D4) > Static Structural (D5) > Solution

Object Name	*Solution (D6)*
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1.
Refinement Depth	2.

TABLE 12
Model (D4) > Static Structural (D5) > Solution (D6) > Solution Information

Object Name	*Solution Information*
State	Solved
Solution Information	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Update Interval	2.5 s
Display Points	All

TABLE 13
Model (D4) > Static Structural (D5) > Solution (D6) > Results

Object Name	*Equivalent Stress*	*Maximum Shear Stress*	*Normal Stress*
State	Solved		
Scope			
Scoping Method	Geometry Selection		
Geometry	All Bodies		
Definition			
Type	Equivalent (von-Mises) Stress	Maximum Shear Stress	Normal Stress
By	Time		
Display Time	Last		
Calculate Time History	Yes		
Use Average	Yes		
Identifier			
Orientation			X Axis
Coordinate System			Global Coordinate System
Results			
Minimum	7554.8 Pa	4361.7 Pa	-1.7824e+006 Pa
Maximum	4.2355e+006 Pa	2.2062e+006 Pa	5.192e+006 Pa
Information			
Time	1. s		
Load Step	1		
Substep	1		
Iteration Number	1		

Material Data
Structural Steel

TABLE 14
Structural Steel > Constants

Density	7850 kg m^-3
Coefficient of Thermal Expansion	1.2e-005 C^-1
Specific Heat	434 J kg^-1 C^-1
Thermal Conductivity	60.5 W m^-1 C^-1
Resistivity	1.7e-007 ohm m

TABLE 15
Structural Steel > Compressive Ultimate Strength

Compressive Ultimate Strength Pa
0

TABLE 16
Structural Steel > Compressive Yield Strength

Compressive Yield Strength Pa
2.5e+008

TABLE 17
Structural Steel > Tensile Yield Strength

Tensile Yield Strength Pa
2.5e+008

TABLE 18
Structural Steel > Tensile Ultimate Strength

Tensile Ultimate Strength Pa
4.6e+008

TABLE 19
Structural Steel > Alternating Stress

Alternating Stress Pa	Cycles	Mean Stress Pa
3.999e+009	10	0
2.827e+009	20	0
1.896e+009	50	0
1.413e+009	100	0
1.069e+009	200	0
4.41e+008	2000	0
2.62e+008	10000	0
2.14e+008	20000	0
1.38e+008	1.e+005	0
1.14e+008	2.e+005	0
8.62e+007	1.e+006	0

TABLE 20
Structural Steel > Strain-Life Parameters

Strength Coefficient Pa	Strength Exponent	Ductility Coefficient	Ductility Exponent	Cyclic Strength Coefficient Pa	Cyclic Strain Hardening Exponent
9.2e+008	-0.106	0.213	-0.47	1.e+009	0.2

TABLE 21
Structural Steel > Relative Permeability

Relative Permeability
10000

TABLE 22
Structural Steel > Isotropic Elasticity

Temperature C	Young's Modulus Pa	Poisson's Ratio
	2.e+011	0.3